

Patent claims

1. A composite material with a proportion of wood and
with a proportion of crosslinked plastics,

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characterized in that

the proportion of wood has been dispersed in the
form of particles in the crosslinked plastics, and
10 the crosslinked plastics are crosslinked melamine
resin ethers or mixtures composed of from 10 to
90% by weight of partially crosslinked
thermoplastics and of from 90 to 10% by weight of
crosslinked melamine resin ethers.

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2. The composite material as claimed in claim 1,
characterized by a proportion of from 55 to 90% by
weight of wood and a proportion of from 45 to 10%
by weight of crosslinked plastics.

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3. The composite material as claimed in claim 1 and
2, characterized in that the proportion of wood is
present in the form of wood flour, wood particles,
wood granules, wood fibers, and/or wood shavings.

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4. The composite material as claimed in at least one
of the preceding claims, characterized in that the
proportion of wood is in particular in the form of
mixtures composed of wood fibers and of wood
30 shavings in a ratio of from 1:10 to 10:1 at from
65 to 80% by weight, and the proportion of
crosslinked plastics is from 35 to 20% by weight.

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5. The composite material as claimed in at least one
of the preceding claims, characterized in that the
crosslinked plastics are mixtures composed of
partially crosslinked EVA copolymers whose vinyl
acetate content is from 25 to 40% by weight and of

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crosslinked melamine resin ethers in a mixing ratio of from 2:1 to 1:5.

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6. The composite material as claimed in at least one of claims 1 to 5, characterized in that from 3 to 10% by weight of flame retardant, from 0.1 to 2% by weight of pigments, from 0.1 to 5% by weight of 5 stabilizers, and/or from 0.1 to 5% by weight of auxiliaries are present, in each case based on the entirety of wood and plastics.
7. The composite material as claimed in claim 6, 10 characterized in that the stabilizers are UV absorbers and/or free-radical scavengers.
8. The composite material as claimed in claim 6 or 7, 15 characterized in that the auxiliaries are lubricants of the type represented by zinc stearate, calcium stearate, and/or magnesium stearate, and/or release agents of the type represented by talc, aluminum oxide, sodium carbonate, calcium carbonate, silica, and/or 20 polytetrafluoroethylene powder.
9. The composite material as claimed in at least one 25 of the preceding claims, characterized in that the crosslinked melamine resin ethers and the partially crosslinked thermoplastics are present in foamed form.
10. The composite material as claimed in at least one 30 of the preceding claims, characterized in that it is present in the form of a sheet, profile, or injection molding.
11. The composite material as claimed in at least one 35 of the preceding claims, characterized in that the crosslinked melamine resin ethers are crosslinked etherified melamine resin condensates which are free from hydroxymethyleneamino groups bonded to the triazine rings of the melamine resin

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condensate, and from -NH-CH₂-O-CH₂-NH- groups linking triazine rings, and in which the non-crosslinked etherified melamine resin condensates have been effected via etherification of the hydroxymethylamino groups of the non-etherified

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melamine resin condensates via C₁-C₁₈ alcohols and/or via polyols of the type represented by diols, triols, and/or tetrols with molecular weights of from 62 to 20 000, and in which the
5 non-crosslinked etherified melamine resin condensates have been hardened thermally and/or via acidifier.

12. The composite material as claimed in at least one
10 of the preceding claims, characterized in that the partially crosslinked thermoplastics are partially crosslinked ethylene-vinyl acetate copolymers, partially crosslinked partially hydrolyzed ethylene-vinyl acetate copolymers, partially
15 crosslinked thermoplastic polyurethanes, partially crosslinked high-molecular-weight aliphatic and/or aromatic-aliphatic polyethers, and/or partially crosslinked aliphatic and/or aromatic-aliphatic polyesters, preferably partially crosslinked
20 polycaprolactones, and/or unsaturated polyesters.

13. A process for production of a composite material as claimed in claim 1,
25 characterized in that

the composite material is produced by an extruder process, where in a
30 a) first stage of the process in a first extruder segment a melt mixture composed of melamine resin ethers, wood, and, if appropriate, thermoplastics is prepared, the melt mixture is devolatilized after homogenization, and, in a second extruder segment, hardener, thermally decomposing free-radical generator, and/or blowing agent are fed into the melt mixture, and are homogenized in the melt mixture, where flame retardants, pigments, stabilizers, and/or auxiliaries can be fed in the
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first and/or second extruder segment, and in a
b) second stage of the process, the wood-
containing melt mixture is either heated in a
third extruder segment, discharged via a die

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with crosslinking and, if appropriate, foaming, and drawn off in the form of a semifinished product, or is discharged from the extruder, and pelletized, and the pellets in a

5 c) third stage of the process are processed in presses, extruders, or injection-molding machines with crosslinking and, if appropriate, foaming to give semifinished products or molded materials.

10 14. The process as claimed in claim 13, characterized in that the length of the extruders is from 30 to 60 D, the melt mixture in the first extruder segment is prepared at melt temperatures of from 110 to 170°C, the feed in the second extruder segment takes place at melt temperatures of from 100 to 150°C, the heating in the third extruder segment takes place to from 150 to 240°C, and the processing in the third stage of the process takes place at temperatures of from 150 to 240°C.

20 15. The process as claimed in claim 13 or 14, characterized in that the melt mixture in the first stage of the process is prepared from melamine resin ethers whose weight-average molecular weight is from 1500 to 200 000 and whose molar melamine/formaldehyde ratio is from 1:1.5 to 1:4.

30 16. The process as claimed in claim 13 or 14, characterized in that, prior to the first stage of the process, wood is impregnated, in mixers, with solutions or dispersions of melamine resin condensates in water or mixtures composed of water and C₁-C₄ alcohols, and is dried, where the melamine resin condensates are etherified melamine resin condensates and/or are melamine resin condensates partially etherified with C₁-C₄ alcohols, the weight-average molecular weights of

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the condensates being from 150 to 50 000 and their molar melamine/formaldehyde ratio being from 1:1.5 to 1:4, and the melamine resin condensates comprise, if appropriate, up to 3% by weight of
5 hardener, based on the melamine resin condensates, and then the melt mixture

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in the first stage of the process composed of the wood pre-impregnated with melamine resins and also of

- melamine resin ethers or
- 5 - thermoplastics or
- mixtures composed of melamine resin ethers and thermoplastics

is prepared.

10 17. The process as claimed in claim 16, characterized in that the solids content of the solutions or dispersions is from 20 to 80% by weight, the impregnation process takes place at from 80 to 120°C, the length of the extruders is from 30 to 15 60 D, the melt mixtures in the first extruder segment are prepared at melt temperatures of from 110 to 170°C, the feed in the second extruder segment takes place at melt temperatures of from 100 to 150°C, the heating in the third extruder segment takes place to temperatures of from 150 to 20 240°C, and the processing in the third stage of the process takes place at temperatures of from 150 to 240°C.

25 18. A process for production of a composite material as claimed in claim 1,

characterized in that

30 the composite material is produced by a sintering process where in a
35 a) first stage of the process, mixtures composed of wood and of plastics which are composed of melamine resin ethers or which are composed of mixtures composed of melamine resin ethers and of thermoplastics, or are composed of thermoplastics, are sintered in high-speed mixers, the sinter mixture is cooled, and, after cooling, hardeners,

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thermally decomposing free-radical generators,
and/or blowing agents, flame retardants, pigments,
stabilizers, and/or auxiliaries are applied to the
sinter mixture in the drum mixer, and in a
5 b) second stage of the process, the sinter mixture
comprising wood, and comprising melamine resin
ethers and, if appropriate, comprising
thermoplastics is processed in presses, in
extruders,

or in injection-molding machines, with crosslinking and, if appropriate, foaming, to give semifinished products or molded materials.

5 19. The process as claimed in claim 18, characterized in that the sintering process in the first stage of the process takes place in high-speed mixers with residence times of from 3 to 30 min and final temperatures of from 90 to 180°C, the process of
10 cooling of the sinter mixture takes place to temperatures of from 50 to 120°C, and the processing of the sinter mixture in the second stage of the process takes place at temperatures of from 150 to 240°C.

15 20. The process as claimed in at least one of claims 13 to 19, characterized in that the wood used is in the form of wood flour, wood particles, wood granules, wood fibers, or wood shavings, and comprises from 3 to 10% by weight of sodium borate or sodium borate/boric acid mixtures in a ratio by weight of from 1:9 to 9:1.

25 21. The process as claimed in at least one of claims 13 to 20, characterized in that the hardener used comprises aliphatic C₄-C₁₈ carboxylic acids, aromatic C₇-C₁₈ carboxylic acids, acidifiers of the type represented by blocked sulfonic acids, alkali metal salts, or ammonium salts of phosphoric acid, C₁-C₁₂-alkyl esters or C₂-C₈-hydroxyalkyl esters of C₇-C₁₄-aromatic carboxylic acids or of inorganic acids, salts of melamine or of guanamines with C₁-C₁₈-aliphatic carboxylic acids, or comprises anhydrides, half-esters or half-amides of C₄-C₂₀ dicarboxylic acids, or comprises half-esters or half-amides of copolymers composed of ethylenically unsaturated C₄-C₂₀ dicarboxylic anhydrides and of ethylenically
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unsaturated monomers of the type represented by C₂-C₂₀ olefins and/or C₈-C₂₀ vinylaromatics, and/or salts of C₁-C₁₂-alkylamines and, respectively, alkanolamines with C₁-C₁₈-aliphatic, C₇-C₁₄-5 aromatic, or alkylaromatic carboxylic acids, or with inorganic acids of the type represented by hydrochloric acid, sulfuric acid, or phosphoric acid.

22. The use of composite materials as claimed in at least one of claims 1 to 12 in the construction industry, in particular for the production of windows, of doors, of cladding elements, and of roof elements in the outdoor sector, or else in the sports and leisure sector for garden furniture and outdoor seating, and for construction of playgrounds.